

A PRELIMINARY ASSESSMENT OF THE SPATIAL DISTRIBUTION OF STONE ARTEFACTS FROM THE SOUTH MOLLE ISLAND ABORIGINAL QUARRY, WHITSUNDAY ISLANDS, CENTRAL QUEENSLAND COAST.

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Distribution of artefacts made from a black tuff raw material type in the Whitsunday region are traced by morphological similarities and petrographic analysis to an Aboriginal quarry source on South Molle Island. Although the petrographic sample size is small and relatively heterogenous there are strong indicators that the source of nearly all the volcanic tuff artefactual material found on the Whitsunday Islands and parts of the adjacent mainland are from this source. Explanations for the pattern of distribution include, proximity to raw material source, regional interaction of social networks and the extent of the Ngaro 'tribal' system. □ *Black tuff, sourcing, South Molle Aboriginal quarry, petrography, Whitsunday Is.*

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This paper presents preliminary results of a study aimed at sourcing stone artefacts, found in the Whitsunday region, to a large Aboriginal quarry on South Molle Island. South Molle Island is one of the Cumberland Islands (northern Cumberlands are termed the Whitsunday Islands) located on the central Queensland coast (Fig. 1). The northern Cumberland group are, according to Tindale (1974); the domain of the Ngaro, whose country extended from Hayman Island in the north down to St Bees Island in the south, including Cape Conway on the mainland coast. Surveys and excavations from islands and the adjacent mainland between Bowen and Midge Point have established an overwhelming homogeneity of artefact raw materials (Barker, 1988, 1989a, 1989b, 1990, 1991a, 1991b, 1992a, 1992b, 1992c, 1993; Hall & Barker, 1989). This material is generally characterised as a black siliceous volcanic tuff and appears identical to the raw material found on the South Molle Island quarry. It was considered that if the black tuff raw material found in the region came from a source or sources other than the quarry on South Molle, that this would be reflected in its pattern of distribution. This paper therefore, examines the distribution of stone artefact raw materials in relation to known quarry sources in the region, and presents the preliminary findings of a petrographic analysis carried out on raw material from the South Molle Island quarry, and on various artefacts from islands and coast as far distant as 100km. It is argued that the majority, if

not all, of the black tuff artefacts found on the islands, and on the adjacent mainland coast, are from this source. The rationale for this argument include; 1, the relative intensity of quarry use; 2, the fact that it is the only known culturally exploited source of black tuff material on the islands; 3, the quarries central location to all the known sites in the region. The preliminary results from the petrography will be discussed in relation to this model below.

#### THE SOUTH MOLLE ISLAND QUARRY

South Molle Island is a small offshore island of 420.5 hectares, approximately 2 km from the mainland. The quarry (SMIQ) is located on the south eastern side of the island, on top of a prominent ridge just above Bauer Bay the main resort beach. Quarried raw material covers an area of 300m along a steep ridge, with flakes and other artefacts scattered down the eastern side for over 200m, and down the western side for 500m. The artefacts are up to 1m deep in places. Three circular pits, where material has been mined, line the top of the ridge (Figs 2, 3A,B). The quarry is dominated by extremely large flakes which have been removed from the substrate and then used as cores (technologically they are retouched flakes). A number of round water rolled cobble hammerstones from the beach are also present (Fig. 3C). The actual substrate from which the raw material has been struck is almost completely covered by huge densities of artefact discard (Fig. 3D). Seventy five large, backed asymmetrical



FIG. 1. The study region.

blades ('Juan Knives') were collected from the quarry site and the beach below the quarry (2 have also been found on islands) (Barker, unpubl.) in prep). The archaeological excavation of in-situ black tuff artefacts from basal strata in Nara Inlet 1 rockshelter on Hook Island, (approximately 18km east of South Molle) demonstrates the early use of the black tuff material. The near basal date of Nara Inlet 1, indicates that a minimum age for the use of the South Molle quarry can be placed at sometime prior to 8150BP (Barker, 1989a, 1991a). Analysis of excavations undertaken in 1992 of a rockshelter directly below the quarry, and on the slopes adjacent to the quarry itself, may shed further light on the quarries antiquity (Fig. 2).

Although the South Molle Island quarry would appear to represent large scale and intensive activity, this view must be tempered with the knowledge that it has probably been in use for at least 8000-9000 years. Recent estimates put the total number of artefacts on the quarry at approximately 7 million (Border, 1993) representing an artefact discard of just 2.1 per day or 766.5 per year. From 5 stratified sites excavated by Barker (1989a, 1991a, 1993) on the Whitsunday Islands, it is clear that discard of black tuff

artefacts occurred in much greater densities in the early period of occupation of the region (sometime before 8150BP until c.2,500BP). After this period, stone artefact discard rates for a 50cm x 50cm excavation square decreased from a maximum of 9.5 artefacts per 100 years in the early phase, to as little as 0.5 artefacts per 100 years during the last c.2500 years (Table 1).

The first level of analysis, in regard to the use of the quarry and the distribution of artefacts in the region, was on observed morphological similarities and differences between raw material types, and an examination of the historical record relating to use or occupation of South Molle Island. It was considered reasonable to assume that if the black tuff raw material came from South Molle Island, that the highest densities of black tuff material would be found in sites within closer proximity to this source (Renfrew, 1977; Sidrys, 1977; McBryde, 1984).

The survey work relating to this study was undertaken as a component of Environmental Impact Statements, or as part of the survey strategy designed for a research Phd project in the region (Barker, unpubl.). The Islands and the mainland coast have been extensively surveyed. The area from Southern Cape Conway down to Midgeton has also been extensively surveyed.

TABLE 1. Temporal discard of black tuff artefacts from stratified sites

Site	Time Span	Number of Artefacts	Discard /100yrs
Hill Inlet 1	*2700-present	49	1.8
Border Island 1	#2500-present	19	0.7
	*6400-2500bp	352	9.5
Nara Inlet 1H	#2500-present	19	0.7
	*8150-2500bp	228	4.1
Nara Inlet 1G	#2500-present	15	0.5
	*8150-2500bp	78	1.4
Nara Inlet AS1	*2500-present	37	1.5

\*These dates represent basal or near basal dates

#These dates corralate with major stratigraphic change and greatly increased densities of other cultural material.

The hinterland area west of Airlie Beach and the Proserpine area have been less extensively surveyed and assemblages from these areas are described from private collections, as well as material held in the Queensland Museum, the Anthropology Museum (Department of Anthropology and Sociology, University of Queensland), the Bowen Historical Society and the Proserpine Cultural Centre.

#### HISTORICAL ACCOUNTS OF ABORIGINAL ACTIVITY ON SOUTH MOLLE

The most authoritative reference to the South Molle Island quarry is from Roth (1904:19) who mentions the site in the context of sources of stone for "stone celts" (edge ground axes). He notes: '*Quarries whence these celts were originally obtained are none too common, there is one on.....Molle Island in the Whitsunday Passage and at Culture Creek, or Happy Valley, about 7 miles from Proserpine*'.

Two other direct historical references to the use of the South Molle Island quarry comes from an account in a popular magazine by Henry Lamond, a former owner of the lease on South Molle Island and from W.E. Bauer, the founder of the South Molle Island resort. Both accounts are relatively recent (1930s-1950's) and may tend to be apocryphal (Lamond was a regular contributor of stories to magazines and newspapers). Lamond's source is an old Aboriginal man named Percy, who stated that the local Aboriginal population used to obtain flint for axes from South Molle Island (Lamond, 1960): '*.....they went to what we call South Molle for stone with which to make tomahawks. They called that island "Whyrriba" which meant stone axe. I should know. It was my home for exactly ten years*'.

Bauer's (1958) account is similar, stating that: '*....the native name for South Molle was "Wer-ri-bee" which translated means stone flints. We have a range on the Island where this flint is very plentiful, and the natives used to make their stone axes here*'.

Although not mentioning the quarry specifically, there are other historical references relating to

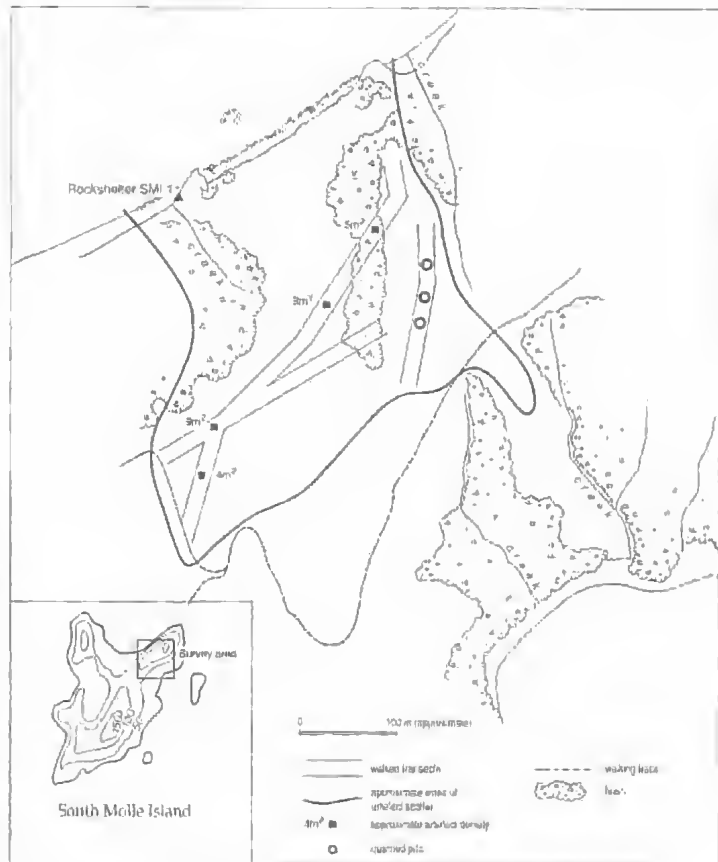


FIG. 2. South Molle Island quarry (adapted from Border, 1993).

the use of the Island itself; for example, Dalrymple (1860) on the Spitfire in 1860, stated that: '*on Lindeman and Molle Island in September dense clouds of smoke rose from the fires of the natives*'.

Dalrymple also describes an encounter with two Aboriginal men in a canoe near South Molle Island, which met them soon after leaving the Port Molle anchorage (and, therefore, probably from South Molle Island itself). Dalrymple (1860:3) states: '*.....a breeze springing up, the two aborigines left us to cross over to Hook Island, a distance of 10 miles*'.

and from an account of the wreck of the schooner 'Eva' it is stated that upon landing on Molle Island the survivors were threatened by hostile Aborigines (Loos, 1982).

Although there is clear prehistoric and historic evidence of the use of the island, the archaeological evidence does not support the idea that the quarry was used for axe manufacture. Extensive

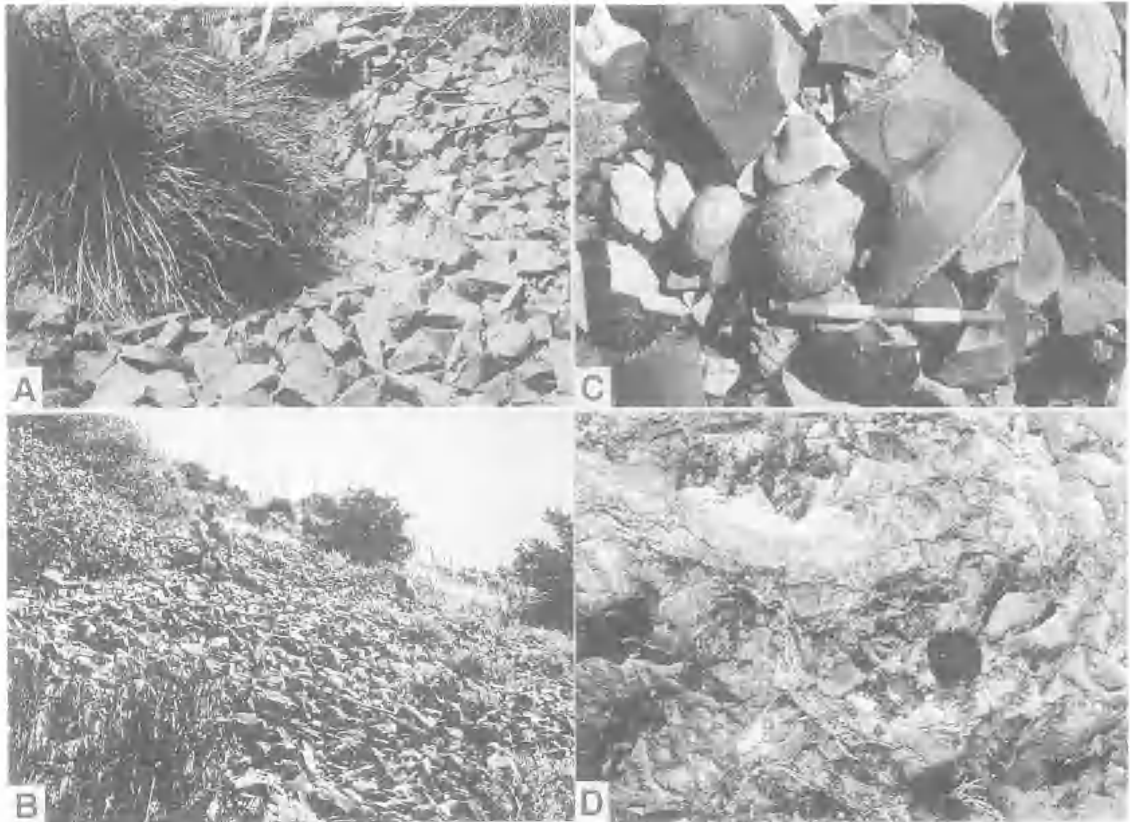


FIG. 3. South Molle Island Quarry.

surveys of axes from the mainland including private collections, collections from local historical societies, and those housed in the Queensland Museum, have not found a single axe manufactured from anything resembling the South Molle Island raw material. Generally, axes are made from rocks with a high degree of plasticity, unlike the South Molle tuff which is highly siliceous and brittle, with excellent flaking characteristics. Additionally, no axes or blanks or any artefact resembling a stage of axe manufacture has ever been found on the quarry, or in the near vicinity. It may be that Roth (1904) when stating that the quarry was used for the manufacture of stone 'celts' was referring to the large backed blades found on the quarry and the beach below it, although his description of stone 'celts' as edge ground axes seems unambiguous. Another possibility is that another source of black tuff material exists, from which axes are manufactured and it is this source which Roth (1904) mistakenly refers to as the Molle Island quarry (considered unlikely because of the acknow-

ledged accuracy of much of Roth's ethnographic accounts, and because of the lack of any evidence that stone axes were made from black tuff raw material).

#### OTHER RAW MATERIAL SOURCES

Although relatively extensive geological surveys have been conducted in the Whitsundays and adjacent mainland (Paine, 1972; Ewart et al., 1992; Bryan, 1991; Parianos, 1992), only one other source of the raw material resembling that of the South Molle Island material (a siliceous tuff) has been located (see below). It cannot be ruled out that other sources also occur on the islands. However, as the formation of the raw material is described as a 'pyroclastic surge deposit' which will usually occupy a relatively discreet, well defined area, it may not be easily located (Bryan, 1991). The geological conditions which create the raw material are, however, considered a relatively rare combination of factors unlikely to be duplicated often (Bryan, 1991). A number of other raw

TABLE 2. Petrographic descriptions.

Type	Artefact	Location	Description
SM	SM2	Sth Molle	Artefacts are characterised by a fine-grained silicified tuff, black to green-grey in colour, with scattered patches of calcite alteration and quartzite/albite. The calcite alteration is characteristic of these implements
SM	SM4	Sth Molle	
SM	WI1	Whitsunday	
SM	SM1	Sth Molle	
SM	SM3	Sth Molle	
SR	SR1	Repulse I	Artefacts are characterised by a fine and even-grained silicified tuff with sparse deformed flammic and bedded opaques
SR	B11	Border I	
SR	HI1	Whitsunday	
UNCLF	MP1	Percy I	Fine grained, strongly welded silicified ignimbrite with glass shards measuring up to 1mm
UNCLF	ER1	Earl. Bay	Fine grained even-textured silicified tuff with sparse quartz veins and bedded opaques
UNC.F	SM5	Sth Molle	More fine grained than the other materials with scattered opaques and traversed by quartz veins. These latter distinguish it from the SM types, to which it is otherwise similar

material sources are known for the region. These are as follows (Fig. 5):

1, Material that superficially looks similar to the South Molle Island source was observed in a commercial quarry used by the Pioneer Shire Council. The source is located near Kuttabul (north of Mackay), 12km inland and 90km south of South Molle Island. Unlike the South Molle Island quarry, however, there is no evidence that this source was utilised during prehistoric times, although it does confirm the presence of a similar raw material type in the region.

2, A quarry source at Happy Valley on 'Culture Creek' (possibly Kelsey Creek) 11km west of Proserpine, is known from the literature (Roth, 1904) but has yet to be rediscovered or characterised. However, artefacts from around the Proserpine region are commonly made on stone that is morphologically dissimilar to that found on South Molle Island, making it unlikely that the raw material from this source is black tuff.

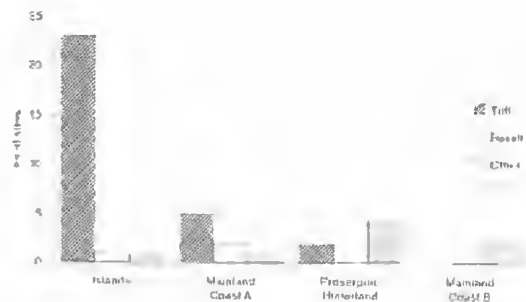


FIG. 4. Raw material sources and distribution within geographical areas.

3, Another raw material source is to be found at Blue Bay on Cape Hillsborough, where beach shingle has been quarried along an extensive area of the eastern end of the headland separating Blue Bay from Halliday Bay. This raw material is a blue-grey volcanic rock, morphologically dissimilar to the South Molle material.

4, A green volcanic material is found on South Repulse Island. Artefacts from this source have been located on South Repulse Island and Cape Conway.

In addition to these sources, the volcanic nature of the region suggests that there would be no shortage of brittle, siliceous raw material sources in the region, a raw material category ideal for stone artefact manufacture.

#### DISTRIBUTION OF BLACK TUFF

Most of the black tuff artefacts are found on the Islands (Fig. 5, Table 3). The mainland coast between Bowen and Southern Cape Conway (Area A Mainland coast) includes a relatively high percentage of black tuff artefacts, but also includes a range of other local raw material types. The area west of Airlie Beach, including the Proserpine region (Proserpine hinterland), has little of the material resembling the black tuff and is dominated by artefacts made from other materials. The area from Repulse Bay down to Midgeton (Area B, Mainland coast) contains no evidence of black tuff material, and is again dominated by a variety of other raw material types (Fig. 4). On this basis, it can be said that the distribution of the black tuff material, with the exception of the Proserpine hinterland, is aligned to the presence of the quarry source, with greater densities appearing nearest to the source.



FIG. 5. Number of sites with different raw materials per geographical area.

The distribution of the material, as outlined above was then further tested by attempting to link the artefactual material to the quarry through petrographic analysis.

#### THE PETROGRAPHIC ANALYSIS

A petrographic classification of various black tuff artefacts from the region was undertaken to determine whether or not the stone artefacts found in archaeological sites on the islands, and adjacent mainland, indeed came from the black tuff quarry source on South Molle Island. Eleven artefacts were thin-sectioned to allow classification by petrography. The aims of this analysis were to initiate a preliminary geological characterisation of the South Molle quarry material; to establish the number of different lithic types of artefacts in the region; and to see if these could be sourced to the South Molle Island quarry. All materials examined were extremely fine-grained and classification was, therefore, made on the basis of alteration of phenocryst assemblages. Two main groups were identified. These are characterised here as SM and SR types (Table 2).

*SM type.* Includes samples SM2 (South Molle quarry), SM4 (South Molle Quarry), W11 (Whitsunday Island), probably SM1 (South Molle quarry) and possibly SM3 (South Molle quarry). These artefacts are characterised by a fine-grained silicified tuff, black to green-grey in colour, with scattered patches of calcite alteration and quartz/albite.

*SR type.* Includes samples SR1 (South Repulse Island), B11 (Border Island) and H11 (Hill Inlet Whitsunday Island). These artefacts are characterised by a fine and even-grained silicified tuff, with sparse deformed fiamme and bedded opaques.

The following samples were unclassified:

MP1 (Middle Percy Island) - a fine grained strongly welded silicified ignimbrite with glass shards measuring up to 1mm.

ER1 (Earlando Bay) - fine grained even-textured silicified tuff with sparse quartz veins and bedded opaques. (except for the quartz veins, this sample could be grouped in the SR type).

SM5 (South Molle Island) - more fine grained than the other materials, with scattered opaques and traversed by quartz veins. These latter distinguish it from the SM type, to which it is otherwise similar.

#### DISCUSSION

Although the sample size is small, some generalisations can be inferred from the data (a more detailed geological characterisation of the quarry site is currently being carried out by the Queensland Department of Environment and Heritage). Most of the material supplied from the quarry (SM2, SM4, SM1 and SM3) can be classified as coming from a single source. The distinctive SM5 sample (also from the quarry and resembling the SM type) suggests that the raw material from the South Molle Island quarry is extremely heterogeneous petrographically, and that a large sample of the quarry material will have to be thin sectioned in order to fully classify it geologically. It is considered that once this is done a wider range of material may also be able to be traced to the South Molle quarry source. Most of the remaining samples, (both SR and

TABLE 3. Number and percentage of sites with different raw materials per geographical area.

	Tuff		Basalt		Other		Total # of sites with artefacts
	#	%	#	%	#	%	
Islands	23	92	1	4	1	4	25
Area A Mainland coast	5	63	2	25	1	12	8
Proserpine hinterland	2	14	8	57	4	29	14
Area B Mainland coast	0	0	2	50	2	50	4
	30	59	13	25	8	16	51

unclassified types) are superficially similar in appearance to the South Molle raw material. We feel that once further geological analysis is completed on the South Molle Island quarry that these types will be characterised as having come from that source.

The SRI sample is a backed implement of green tuff similar to a raw material source found on South Repulse Island and thus probably not from the South Molle Island quarry. MPI from Middle Percy Island 230km south of South Molle Island is the most dissimilar of the raw material types and is thus unlikely to be from the South Molle source.

Although the initial petrographic results are largely inconclusive, the preliminary results regarding the distribution of broader raw material types in the region, specifically the black tuff material, show that this is used almost exclusively on the islands from Hayman down to (at least) the Repulse Islands, and on the mainland coast from Bowen to Cape Conway. We feel confident that once a larger sample of the quarry has been attained, most of the artefacts found on the Whitsunday Islands (northern Cumberlands) and the adjacent mainland coast will be traced to this source. At this stage it cannot be said conclusively from the petrographic evidence that all the black siliceous tuff material found on the islands and adjacent mainland are from the one source. However, it is thought that the geographical distribution of morphologically similar material clusters around the major Aboriginal artefact quarry source on South Molle Island, suggesting that the South Molle quarry is the main, if not only source of artefactual black tuff material in the Whitsundays (northern Cumberlands) (Fig. 4).

## CONCLUSION

The preliminary results of this study show that the distribution of the black tuff raw material is largely restricted to areas within the Ngaro system, either on the islands of the northern Cumberlands or the adjacent Cape Conway mainland coast. This distribution fits very closely with the boundaries for the Ngaro outlined by Tindale (1974), largely confirmed by research of one of us (B.B.) demonstrating that the quarry on South Molle Island is mainly a raw material source for

local use, despite its use over a long period of time. It could be surmised, due to the abundance of suitable raw materials throughout the wider region, that raw material of the quality of the South Molle source is common-place and, therefore, is not as likely to be used for trade or carried great distances. The highest number of sites containing this material, as well as the highest densities of this artefactual material, are those within close proximity to the known source on South Molle Island, and are found where distribution by canoe provides the easiest movement (Islands and Area A Mainland coast). It is considered that the absence of the raw material on the mainland coast south west of Cape Conway (Mainland coast B) and the coastal hinterland around Proserpine (Proserpine hinterland) and its presence at Queens Beach, Bowen over 70km to the north, may delineate the degree of interaction between the island/coastal peoples and groups directly to the south, west and north of the Whitsunday Islands.

The preliminary research carried out on the quarry and the artefacts from the archaeological sites needs further investigation. This could include technological analyses and additional geological work in order to more completely characterise the raw material from the quarry and artefacts in order to more conclusively link them to the quarry source.

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#### LITERATURE CITED

- BARKER, B. 1988. An archaeological assessment of the proposed Midge Point Resort Complex, Midge Point, Proserpine. (Unpublished report, University of Queensland Archaeological Services Unit).
- 1989a. Nara Inlet 1: A Holocene sequence from the Whitsunday Islands, central Queensland coast. *Queensland Archaeological Research* 6: 53-76.
- 1989b. 'A preliminary Archaeological Survey of the Proposed Saro's Cove/Endeavour Cove Development, Midge Point, Pioneer Shire, Central Queensland Coast'. (Unpublished report, University of Queensland Archaeological Services Unit).
1990. 'Archaeological assessment of the proposed resort complex development at Midge Point, Midge Mountain, Pioneer Shire, Proserpine'. (Unpublished report, University of Queensland Archaeological Services Unit).
- 1991a. Nara Inlet 1: coastal resource use and the Holocene marine transgression in the Whitsunday Islands, central Queensland. *Archaeology in Oceania* 26: 102-109.
- 1991b. 'An Archaeological Assessment of the Proposed Resort and Marina Development at Shute Bay, Shute Harbour'. (Unpublished report prepared for Scotex Pty Ltd, Sydney).
- 1992a. 'A Heritage assessment of Dent Island, central Queensland coast'. (Unpublished report prepared as part of an Environmental Impact Statement on behalf of Hamilton Island Enterprises Pty Ltd).
- 1992b. 'An assessment of the Historic/Prehistoric Cultural Resource Values and formulation of a Heritage Management Plan for the Whitsunday Islands (northern Cumberland group)'. (Unpublished report prepared for Conway National Park, Airlie Beach).
- 1992c. An assessment of the Historic/Prehistoric Cultural Resource Values of the Mainland Whitsunday Coast. (Report prepared for the Department of Environment and Heritage, Townsville Queensland).
1993. Early human exploitation of island environments within the Great Barrier Reef Marine Park. *Reef Research* 3.
- BAUER, W.E. 1958. Letter to Mr. Ken J. Morris, Deputy Premier and Minister for Labour and Industry, Office of the Minister for Labour and Industry, Brisbane.
- BORDER, A. 1993. South Molle Island Stone Artefact Quarry Archaeological Survey. (Unpublished report to the Queensland Department of Environment and Heritage).
- BRYAN, S.E. 1991. Geology and Geochemistry of the Southern Molle group, the Whitsundays, north-east Queensland. (Unpublished Bsc. Hons. Thesis; Department of Geology, University of Queensland).
- DALRYMPLE, G.E. 1860. 'Report of the Proceedings of the Queensland Government Schooner "Spitfire" in search of the mouth of the River Burdekin'. (T.P. Pugh; Brisbane).
- EWART, A., SCHON R., CHAPPELL, B.W. 1992. The Cretaceous volcanic-plutonic province of the central Queensland (Australia) coast-a rift related 'calc-alkaline' province. *Transactions of The Royal Society of Edinburgh* 83: 327-345.
- HALL, J. & BARKER, B. 1989. An archaeological assessment of the proposed Woodwark Bay Resort complex, Woodwark Bay, Airlie Beach. (Unpublished report, University of Queensland Archaeological Services Unit).
- LAMOND, H.G. 1960. An Island Tribe. *North Australian Monthly* 7: 35-40.
- LOOS, N. 1982. 'Invasion and Resistance-Aboriginal/European relations on the North Queensland frontier 1861-1897'. (ANU Press; Canberra).
- PAINE, A.G.L. 1972. Proserpine 1:250,000 geological Series: Explanatory notes. (Australian Government Publishing Service; Canberra).
- MCBRYDE, I. 1984. Kulin greenstone quarries: the social contexts of production and distribution for the Mt William site. *World Archaeology* 16: 267-285.
- PARIANOS, J. 1992. Geology of the Airlie Block. (Unpublished Msc. Department of Geology; University of Queensland).
- RENFREW C. 1977. Alternative models for exchange and spatial distribution. Pp. 71-90. In Earle, T.K. & Ericson, J.E. (eds), 'Exchange systems in Prehistory'. (Academic Press; New York).
- ROTH, W.E. 1904. Domestic Implements, arts and manufactures. *North Queensland Ethnography Bulletin* 7. (Department of Public Lands; Brisbane).
- SIDRYS, R. 1977. Mass-distance measures for the Maya obsidian trade. Pp. 91-108. In Earle, T.K. & Ericson, J.E. (eds), 'Exchange Systems in Prehistory'. (Academic Press; New York).
- TINDALE, N.B. 1974. 'Aboriginal Tribes of Australia'. (University of California Press; Los Angeles).